

sequent ideas from the point of view of the framework of this system. Joseph Agassi eschews the attempt to write an intellectual biography, referring to his book as "a new kind of historical novel, parallel to today's semidocumentaries," and urging the reader to "take my documentation less as a tool of scholarship and more as an attempt to create an air of verisimilitude" (p. xiii). Agassi states that his concern is to "illustrate a philosophy" and to be "thought-provoking": "better an interesting error . . . than a dull truth" (*ibid.*).

Faraday as a Natural Philosopher is an attempt to characterize Faraday's view of nature, and Agassi does succeed in capturing something of Faraday's personality. But this book in no sense aims at an historical treatment of Faraday. The major problems of Faraday's sources, of the changes in Faraday's conception of nature, and of the relationship between his developing views on the nature of reality and his theories of electricity and magnetism receive little illumination. In this sense Agassi's book adds nothing new to our understanding of Faraday. However, Agassi does avoid one of the more controversial features of Williams' book: the attempt to interpret Faraday's electrical theories from the point of view of Williams' own reconstruction of Boscovichian point atomism. Thus, Agassi's final chapters provide a useful introduction to Faraday's scientific thought.

The key feature of this book, as Agassi points out, is its individualistic cast (what Agassi refers to as his desire to be "thought-provoking"). Reactions to this aspect are likely to be especially subjective, but I did not find the book stimulating. Agassi states that he is attempting to integrate the scientific and psychological aspect of Faraday's personality, but much of the analysis is unilluminating and his approach unoriginal. His view of Faraday as a theoretician, not merely an experimenter, is hardly a new one, and his claim that no other study of Faraday stresses the view that Faraday "saw forces stationed in space" (p. 188) seems odd, for this is fundamental to Williams' book.

The worst feature of this book is the large number of errors it contains. I will give examples which illustrate certain features of Agassi's approach. In the discussion of the relationship between Faraday and Maxwell it is simply incorrect to assert that Maxwell's

Joseph Agassi. *Faraday as a Natural Philosopher*. xiv + 359 pp., bibl., index. Chicago/London: University of Chicago Press, 1971.

Faraday has been the subject of some scholarly attention—and a certain amount of scholarly controversy—in recent years. L. Pearce Williams' *Michael Faraday* (1965) has been criticized for the way Williams interpreted Faraday's science and for his failure to study Faraday in historical context. Writing a scientific biography, Williams adopted an old-fashioned approach to intellectual history, supposing the hero to have formulated, however imprecisely, a system of concepts at a relatively early age, interpreting his sub-

concept of electric displacement was proposed as the result of a symmetry argument (p. 310); and study of the literature vitiates Agassi's assertion that Faraday was the first to develop a view of force as a causal agent in a manner which denied traditional matter-spirit and substance-attribute categories (p. 113), for such ideas were proposed by eighteenth-century British natural philosophers. These examples are not trivial, but illustrate important features of this book: Agassi's frequent, misleading, and anachronistic comparisons of Faraday's views with those of later theorists, and his failure to examine the context of Faraday's ideas. The statement on page 203 that Faraday developed the theory of matter as defined by force by 1834 (not 1844?) seems extraordinary; but Agassi is so cavalier in his use of sources that it is often difficult to unravel the relation between his assertions and their textual basis.

Agassi's claim that Faraday was ignored is a pure simplification. In support of this contention he quotes citation in the *Oxford English Dictionary* to the effect that Faraday's term 'field' was not employed in Faraday's sense until 1863, by Tyndall (p. 298). But closer acquaintance with the primary sources would have shown him that William Thomson (in 1851) and Maxwell (in 1854) both used the term in the same sense as Tyndall. In any event, the rapid attention to Faraday's ideas by Thomson (in the 1840s) and Maxwell (in the 1850s) belies Agassi's claim.

P. M. HEIMANN

Whipple Museum

History and Philosophy of Science

University of Cambridge

Cambridge CB2 3RH, England